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10/074,493

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Nikolai Ledentsov

QIL-5

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7590

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EXAMINER

JACKSON, CORNELIUS H

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 07/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/074,493

**Applicant(s)**

LEDENTSOV ET AL.

**Examiner**

Cornelius H. Jackson

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14, 16-73, 85-89 and 91-95 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14, 16-73, 85-89 and 91-95 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All - b) ☐ Some\* - c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Acknowledgment***

1. Acknowledgment is made that applicant's Amendment, filed on 20 April 2004, has been entered. Upon entrance of the Amendment, claims 1, 3, 5, 7-13, 16, 17, 29, 40, 47, 69 and 91 were amended, claims 15 and 74-84 were cancelled and claims 93-95 were added. Claims 1-14, 16-73, 85-89 and 91-95 are now pending in the current application.

### ***Specification***

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Double Patenting***

3. ~~Applicant is advised that should claim 1 be found allowable, claim 91 will be~~  
objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-14, 16-73, 85-89 and 91-95 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such away as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In this case, a semiconductor device *such that light in a resonant optical mode propagates in the cavity in a direction tilted with respect to both a direction normal to a lateral plane and the lateral plane itself* is not taught or described in the specification in such away that one skilled in the art could make a cavity that operates (or is designed to operate) in manner stated above.

***Claim Objections***

6. Claim 5 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The feedback mechanism does not constitute a further limitation since it is constructed only of the element presented within the intervening claims.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-9, 14, 19-23, 63, 85 and 91-95 are rejected under 35 U.S.C. 102(b) as being anticipated by Applicant's Admitted Prior Art (APA). Regarding claims 1, 91 and 92, APA discloses a semiconductor laser/device **Fig. 1** comprising: a bottom reflector **102**, a top reflector **110**, and a cavity located between the bottom reflector **102** and the top reflector **110** comprising an active region **17** located within the cavity, wherein the cavity and the active region **17** are designed such that light in a resonant optical mode propagates in the cavity in a direction tilted with respect to both a direction normal to a lateral plane and with respect to the lateral plane.

Regarding claims 2-9, 14, 19-23, 63, 85 and 93-95, APA discloses all the stated limitations, **see specification, Fig. 1 and page 6, line 15-page 8, line 5.**

9. Claims 1-6, 17, 19-23, 27, 28, 63, 85, 91 and 92 are rejected under 35 U.S.C. 102(b) as being anticipated by Lim et al. (5757837). Regarding claims 1, 91 and 92, Lim et al. disclose a semiconductor laser/device **Figs. 1 and 15-18** comprising: a

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bottom reflector **24**, a top reflector **36**, and a cavity **26** located between the bottom reflector **24** and the top reflector **36** comprising an active region **30** located within the cavity **26**, wherein the cavity **26** and the active region **30** are designed such that in a resonant optical mode propagates in the cavity in a direction tilted with respect to both a direction normal to a lateral plane and with respect to the lateral plane.

Regarding claims 2-15, 17, 19-23, 27, 28, 63 and 85, Lim et al. disclose all the stated limitations, **see Figs. 1 and 15-18, col. 3, line 59-col. 4, line 67 and col. 8, line 11-col. 9, line 39.**

10. Claims 1, 2, 4-13, 18-24, 58-63, 85, 91 and 92 are rejected under 35 U.S.C. 102(b) as being anticipated by Hanke et al. (5973336). Regarding claims 1, 91 and 92, Hanke et al. disclose a semiconductor laser/device **Fig. 1** comprising: a bottom reflector **2**, a top reflector **5**, and a cavity located between the bottom reflector **2** and the top reflector **5** comprising an active region **4** located within the cavity, wherein the cavity and the active region **4** are designed such that light in a resonant optical mode propagates in the cavity in a direction tilted with respect to both a direction normal to a lateral plane and with respect to the lateral plane, **see col. 1, line 52-col. 3, line 40.**

Regarding claims 2, 4-13, 18-24, 58-63 and 85, Hanke et al. disclose all the stated limitations, **see Figs. 1 and 15-18, col. 3, line 59-col. 4, line 67 and col. 8, line 11-col. 9, line 39.**

11. Claims 1-6, 17-23, 25, 58-63, 85, 91 and 92 are rejected under 35 U.S.C. 102(b) as being anticipated by Magnusson et al. (6154480). Regarding claims 1, 91 and 92, Magnusson et al. disclose a semiconductor laser/device **Figs. 2, 5, 6 and 8-15**

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comprising: a bottom reflector **12'/32**, a top reflector **22**, and a cavity located between the bottom reflector **12'/32** and the top reflector **22** comprising an active region **24'** located within the cavity, wherein the cavity and the active region **24'** are designed such that light in a resonant optical mode propagates in the cavity in a direction tilted with respect to both a direction normal to a lateral plane and with respect to the lateral plane.

Regarding claims 2-15, 17-23, 25, 58-63 and 85, Magnusson et al. disclose all the stated limitations, **see Figs. 2, 5, 6 and 8-15, col. 4, line 6-col. 7, line 50.**

12. Claims 1, 2, 4-13, 18, 24, 85, 86 and 91-95 rejected under 35 U.S.C. 102(e) as being anticipated by Bewley et al. (6643305). Regarding claims 1, 85, 91 and 92, Bewley et al. disclose a semiconductor laser/device **Fig. 2** comprising: a bottom reflector **130**, a top reflector **120**, and a cavity (**cavity**) located between the bottom reflector **130** and the top reflector **120** comprising an active region **10** located within the cavity, wherein the cavity and the active region **10** are designed such that light in a resonant optical mode propagates in the cavity in a direction tilted with respect to both a direction normal to a lateral plane and with respect to the lateral plane.

Regarding claim 2, Bewley et al. disclose a substrate **60**.

Regarding claim 4, Bewley et al. disclose a at least one quantum well **10**, **see** **col. 5, lines 40-42 and col. 11, lines 43-55.**

Regarding claims 5, 6 and 18, Bewley et al. disclose all the stated limitations, **see Fig. 2.**

Regarding claims 7-13 and 93-95, Bewley et al. disclose all the stated limitations, **see Fig. 2 and col. 4, line 33-col. 8, line 58.**

Regarding claims 24 and 86, Bewley et al. disclose all the stated limitations, **see Fig. 2, reference numerals 90 and 100.**

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lim et al. (5757837). Lim et al., as applied to claims 1-9, 14, 17, 19-23, 27, 28, 63, 85 and 91-95 above, teach all the stated limitations, except for the optical aperture being made by partial selective removal of several layers of the top reflector. It would have been an obvious matter of design choice to any known method in the art make an optical aperture, since applicant has not disclosed that partial selective removal solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with an additional layer add on top of the top reflector; therefore being a known equivalent in the art.

15. Claims 16 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Magnusson et al. (6154480). Magnusson et al., as applied to claims 1-6, 17-23, 25, 58-63, 85, 91 and 92 above, teach all the stated limitations, except for the optical aperture being made by partial selective removal of several layers of the top reflector. Regarding claim 16, it would have been an obvious matter of design choice to any



known method in the art make an optical aperture, since applicant has not disclosed that partial selective removal solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with an additional layer add on top of the top reflector; therefore being a known equivalent in the art.

Regarding claim 26, Magnusson et al. teach all the stated limitations, except for a grating fabricated above the top reflector, wherein the grating provides a distributed feedback in a lateral direction. It would have been an obvious matter of design choice to any known element in the art that provides a distributed feedback in a lateral direction, since applicant has not disclosed that a grating fabricated above the top reflector solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the top reflector being partially etched; therefore being a known equivalent in the art.

16. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hanke et al. (5973336). Hanke et al., as applied to claims 1, 2, 4-13, 18-24, 58-63, 85, 91 and 92 above, teach all the stated limitations, except for a grating fabricated above the top reflector, wherein the grating provides a distributed feedback in a lateral direction. It would have been an obvious matter of design choice to any known element in the art

that provides a distributed feedback in a lateral direction, since applicant has not disclosed that a grating fabricated above the top reflector solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with one mirror on each side of the cavity; therefore being a known equivalent in the art.

***Response to Arguments***

17. Applicant's arguments filed 20 April 2004 have been fully considered but they are not persuasive.

18. Applicant argued, that the cited prior art fails to teach ***light in a resonant optical mode propagates in the cavity in a direction tilted with respect to both a direction normal to a lateral plane and the lateral plane itself.*** In response, it is inherent that some of the radiation, produced by the active region within the cavity, propagates in a direction tilted with respect to both directions normal to the lateral plane and the lateral plane itself.

19. Applicant argued, that in conventional lasers output occurs normal to a semiconductor pn junction plane or in the semiconductor pn junction plane itself. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the output of the laser *being tilted*) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

20. Applicant argued, Hanke et al. discloses a LED and not a laser. In response, the claim limitations fail to limit the claim to being a laser, since the recitation of a semiconductor laser has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and

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where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

21. Applicant argued, prior art is designed such that "as many modes can propagate" within the cavity. In response, the claim limitation fails to limit the claim to only producing modes that propagate in the cavity in a tilted direction.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cornelius H. Jackson whose telephone number is (571)272-1942. The examiner can normally be reached on 8:00 - 5:00, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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